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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,435	03/30/2004	Sean K. Lehman	IL-10883	5470
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EXAMINER				
LAMPRECHT, JOEL				
ART UNIT		PAPER NUMBER		
3737				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/814,435

**Applicant(s)**

LEHMAN, SEAN K.

**Examiner**

JOEL M. LAMPRECHT

**Art Unit**

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claims 3 objected to because of the following informalities: Regarding claim 3, "predetermine" should read "predetermined", and the current language used in the recitation of the claim is confusing. Regarding claims 4-8 and 24-26 it is unclear what further steps in the method have been set forth as the claims only appear to set forth structural elements. Regarding claims 9, 20, and 27, the claims set forth a capability of the images which are formed without providing additional steps in the method. Regarding claims 30 and 45, the current recitation only sets forth that the images "may be" constructed. Regarding claims 35, 36, 40-44, and 47 it is unclear exactly what further structural limitation has been set forth. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1, 3-12, 14, 16, 17, 19-22, 24-30, 32-39, and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Cespedes et al (US 2003/0199767). Cespedes et al disclose a wave-based imaging method and apparatus comprising directing energy waves outward along a predetermined axis (0005-0008), receiving energy waves from

one or more objects and processing the received waves including applying an algorithm to map location and parameters of the received energy waves to image those objects (0041, 0044, 0049, 0072 (figure 19), 0091, 0094, 0102, 0117, 0143, 0164-0189), including an annular array comprising multiple fixed transducer elements capable of launching a field wave as well as a single transducer array capable of rotating up to 360 degrees about a rotational axis (0162, 0187-0188), said transducer is arranged about a distal end of a catheter, is able to receive approximately 90-degrees of content from radial-scattered waves (0175, 0189), image acquisition is capable of being formed along a plane perpendicular to the axis of rotation (0005, 0096), frequencies of transmission lie between 100 Hz and 10Ghz, including imaging ultrasonic frequencies and therapeutic ultrasound frequencies (0111), the interspace includes a living vessel (0089-0090), the received energy is able to help determine the risk of rupture or thrombosis (0141), the transducers are able to obtain measurements regarding external pressure to the artery (0115-0118, 0159-0160), and then characterize the plaque elements which exist within the artery (0115-0118, 0159-0160, 0165).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 18, 23, 31, 45- 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cespedes et al (US 2003/0199767). Cespedes et al disclose all that is listed above, mainly a wave-based imaging method and apparatus comprising directing energy waves outward along a predetermined axis (0005-0008), receiving energy waves from one or more objects and processing the received waves including applying an algorithm to map location and parameter of the received energy waves to image those objects (0164-0189), including an annular array comprising multiple fixed transducer elements capable of launching a field wave as well as a single transducer array capable of rotating up to 360 degrees about a rotational axis (0162, 0187-0188), said transducer is arranged about a distal end of a catheter, is able to receive approximately 90-degrees of content from radial-scattered waves (0175, 0189), image acquisition is capable of being formed along a plane perpendicular to the axis of rotation (0005, 0096), frequencies of transmission lie between 100 Hz and 10Ghz (0111), the interspace includes a living vessel (0089-0090), the received energy is able to help determine the risk of rupture or thrombosis (0141), the transducers are able to obtain measurements regarding external pressure to the artery (0115-0118, 0159-0160), and then characterize the plaque elements which exist within the artery (0115-0118, 0159-0160, 0165).

Cespedes et al do not specifically disclose which algorithm they use to map angular location and frequency parameters, but use finite area relations in Euclidean space and vector functions in 2/3d planes to acquire wave data which in turn helps acquire angular location of the return signals. The specific application of a "Hilbert

space inverse wave" algorithm is not discussed but for a finite dimensional space the application of the more generalized Hilbert space would appear very similar to a conventional inverse wave problem in Euclidean space. That is, given certain knowledge of the area being imaged, and the waveforms being sent and received, a problem solved on the basis of Hilbert space will intuitively acquire the same properties of a finite dimensional problem. Angular locations and distances represented by the dot product or other functional expressions (FFT, Helmholtz) in Euclidean space correlate to the same problem within a finite Hilbert space. The knowledge required of one skilled in the art at the time of the invention to perform the angular locations disclosed by Cespedes could be characterized as Hilbert space inverse wave problems where specific properties of vector space are known as disclosed in Cespedes in (0005-0007, 0173-0176, 0154-0157). Therefore it would have been obvious to one of ordinary skill and creativity in the art at the time of the invention to have applied a Hilbert space inverse wave algorithm to the angular location methods of Cespedes if a more-general solution set was desired.

Claims 13, 15, 40, 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cespedes et al in view of Zhdanov (US 6,876,878 B2). Cespedes et al discloses the invention substantially as noted but fails to disclose using their system for the purposes of analyzing automobile parts, bore holes or a waste contaminant container. Attention is then directed to the secondary reference by Zhdanov which discloses medical ultrasound adaptations in a wide variety of applications including those of bored holes in supports, automobile parts and other similar hollowed masses

(Col 13 Line 20-40). It would have been obvious to one of ordinary skill in the art at the time of the invention to have incorporated the applications of Zhdanov with the devices of Cespedes to adapt the ultrasound system for performance in the previously mentioned applications for the purpose of obtaining information about cylindrical mediums via ultrasound.

### ***Response to Arguments***

Applicant's arguments filed 2/08/08 have been fully considered but they are not persuasive. Regarding Applicant's argument that Cespedes et al does not teach the application of mapping angular location, Examiner respectfully disagrees. Applicant points to the portion of the cited application which includes the functions which provide additional parameter data from selected angular positions within the vessel, which is correctly cited, but overlooks the recitation of angular location mapping including but not limited to (0041, 0044, 0049 (as cited in the arguments), 0072 (figure 19), 0091, 0094, 0102, 0117, 0143, 0183, 0184 and 0187). The vessel parameter data is presented in the reference as a graphical representation in conjunction with other datum as in 0049 where the angular position is one of the 3 sets of parameters listed. Specifically 0091, 0141-0143 and 0154 show that the temperature profile or any other vessel parameters are used in conjunction with an image mapping the angular position for the purpose of providing a concise display of information about specific angular sections.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel M. Lamprecht whose telephone number is (571) 272-3250. The examiner can normally be reached on Monday-Friday 7:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ruth S. Smith/  
Primary Examiner, Art Unit 3737

JML